Work Ord 6 <i>May-28-13</i> 8:42		102351	=: <u>=</u> :		Page 1						
Revision ID:	646.3510 Strut)		Accept	*N900	040	100)* s	Setup Star	I	S1* S2*
Start Date: Required Date: Reference:	5/27/13 6/08/13	Start Qty: 10.00 Req'd Qty: 10.00	*10* *10*		Cust Item 1 Customer:	ID:					
Approvals:	Process QC:	Plan: MC3	Date: \3-05-29_ Date:			ate:	and the second s	R	tun Star Stop	1/1	R1* R2*
Sequence ID/ Work Center II	· -	Operation Description	. <u> </u>	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr 646.3500 110 *110* Waterjet		Revision Nbr N/C Y/R OK M	13/6/3	0.00				10			Je 13.07.13

FLOW CNC Waterjet

2-Deburr if necessary

120

QC2- Inspect parts off machine FAI/FAIB

0.00

120

Memo

0.00

Quality Control

NCR: \	/es / 1	٧o			WORK ORDER NON-C	:ON	IFORN	//ANCE / UPI	DATE			
								<u>-</u>		QA Closed:	Date:	
Work Orde	er:				DISPOSITION		·		AGAINST DE	PARTMENT	/PROCESS	
					Rework	1		Skid-tube	Crosstube]	Water Jet	Engineering
Part N	No.				Scrap		ſ	Machining	Small Fab	Pro	d. Eng. Coor.	Quality
					Use-as-is			noforming	Finishing	Rec/Sto	re/Packaging	Other
NCR N	No				Work Order Update			Large Fab	Composite	_	Supplier	<u> </u>
Root				Descri	ption of work order update	Ir	nitial	Act	tion	Sign &		
Cause	Da	te Step	Qty		or Non-conformance	Chi	ef Eng	Descr	ription	Date	Verification	QC Inspector
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Other	Щ								•			
Process	Щ					ĺ		ŀ	·			
Supplier	Н	}										
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	ng Gear				General FA	AULI	CATE	JURY	·· · · · · · · · · · · · · · · · · · ·			
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		^{്ര} re Not Conce	entric to		BOM/Route	-	Hardwa	ro	-	Over/Under	tolerance	Temperature/Cure
	Crack		intine to	·''	Broken/Damaged	-		on Incomplete		Part Incorred		Weld
	\vdash	ned/Crimped	ł		Burrs	-	•	ions Incomplete/L	Jnclear	Part Lost/Mi	├	Wrong Stock Pulled
•	Cuffs	-	,		Contamination	-	Mainte			Part Moved] B
	\vdash	Treat		<u> </u>	Countersink	\vdash	Mislabe			Positioned V	Vrong	
-	${f oxed{H}}$	ction Strip i	n Tube	<u> </u>	Cut Too Short	-	Misread			Power Loss/		Other
	— `	es in Bend		<u> </u>	Drill Holes	\Box	Offset		L	<u> </u>		•
	⊢ ⊸ ``	ue Waves in	Extrusio	n –	Drawing	П	Out of C	Calibration				
	Turning Sequence Finish						Out of Sequence					

Outside Dimensions

DQA:

Date:

Wave/Twist in Tube

Work Orde May-28-13 8:42:	49 AM		*102	- <u></u> -	·=- · =	==	Page 2			
Revision ID:	546.3510 Strut	re i en en en en en	Accept	*N900	ก 4ก	100)* s	Setup Star Stop	1 7	S1* S2*
Start Date: 5 Required Date: 6 Reference:	5/27/13 5/08/13		*10* *10*	Cust Item I Customer:	D:					
	Process Pl	lan: Date: Date:	Tooling: SPC (Y/N):		nte:	· 	R	kun Star Sto	171	R1* R2*
Sequence ID/ Work Center ID 130 *120* QC Quality Control		Operation Description QC8- Inspect parts - second check Memo	Set Up/ Run Hours 0.00	Tool 1D	Tool#	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140 *140 *Small Fab Small Fab		Memo 1- Fabricate tube as per dy	0.00 0.00				10	_Q_	<i>[3:</i>	7-29

150

QC5- Inspect part completeness to step on W/O

0.00

150

Memo

0.00

1307.30 -(DAS

Quality Control

NCR:	Yes	7	No
	,	•	

DQA:

Date:

NCR: Y	es / No)			WORK ORDER NON-	-CON	FORN	//ANCE / UPI	DATE	QA Closed:	Date	: :
Morle Ordo				<u> </u>	DISPOSITION				AGAINST D	EPARTMENT,	PROCESS	
Work Orde Part N					Rework Scrap] [Skid-tube Machining	Crosstube Small Fab	=1	Water Jet d. Eng. Coor.	Engineering Quality
NCR N	o				Use-as-is Work Order Update	╛┃		noforming Large Fab	Finishing Composite	Rec/Sto	e/Packaging Supplier	Other
Root				Descr	iption of work order update	In	nitial	Act	tion	Sign &		
Cause	Date	Step	Qty		or Non-conformance	Chi	ef Eng	Descr	ription	Date	Verification	QC Inspector
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upplier	_											
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						FAULT	CATE	SORY			. ,	
Landir 1	ng Gear			_	General				_		_	-
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		Not Conc	entric to	o/s	BOM/Route	-	Hardwai		<u> </u>	Over/Under		Temperature/Cure
	Cracks				Broken/Damaged	-	•	on Incomplete	<u> </u>	Part Incorred	<u> </u>	Weld
	Crushe	d/Crimped	d	<u> </u> _	Burrs	_		ions Incomplete/L	Unclear	Part Lost/Mi	ssing	Wrong Stock Pulled
	Cuffs			<u> </u>	Contamination	\vdash	Mainte		_	Part Moved		
	Heat T	reat		<u> </u>	Countersink		Mislabe	led		Positioned V		_
란다	Inspec	tion Strip i	n Tube		Cut Too Short	-	Misread	l .		Power Loss/	Surge	Other
[Ripple	in Bend		L	Drill Holes	\Box	Offset					
	Torque	Waves in	Extrusio	n L	Drawing	Щ°	Out of C	Calibration				
	Turnin	g Sequenc	e	L	Finish	\square	Out of S	Sequence				
	Maya	Twict in To	the	ſ	Folio	1 1	Outside	Dimensions				

Work Order ID 10235

102351

Page 3

May-28-13 8:42:49 AM 646.3510 Item ID: Accept Setup Start **Revision ID:** Strut Item Name: Start Qty: 10.00 **Start Date:** 5/27/13 Cust Item ID: Req'd Qty: 10.00 Required Date: 6/08/13 **Customer:** Reference: Run Process Plan: Date: Tooling: Date: Approvals: Stop Date: **SPC (Y/N):** Date: Sequence ID/ Tool ID Tool # Plan Accept Reject Reject Operation Set Up/ Insp. Work Center ID Qty Number Stamp Description Code Qty Run Hours Weld per dwg A/R Aluminum rod Batch: 1235) 160 *160* 10 12 13-7-29 0.00 Large Fab Memo Weld tube to plate as per dwg. DT9867 Large Fab Weld end were tube is punched 170 QC9- Inspect visual per QSI004- Fusion Welds 0.00(3) 13-01-30 PM *170* QC 0.00 Memo Quality Control QC5- Inspect part completeness to step on W/O 180 0.00 (D) 13:07:30 *180* QC 0.00 Memo Quality Control

NCR:	Yes	1	No
	1 - 3		

DQA:

Date: _

NCR: Y	CR: Yes / No WORK ORDER NON-CONFORMANCE / UPDATE												
										QA Closed:	Date	: :	
Work Orde	r:				DISPOSITION		AGAINST DEPARTMENT/PROCESS						
Doet N		· · ·		····	Rework]		Skid-tube Machining	Crosstube Small Fab	Bro	Water Jet d. Eng. Coor.	Engineering Quality	
Part N	o	. .			Scrap Use-as-is	┨╻		noforming	Finishing		e/Packaging	Other	
NCR N	o		<u> </u>		Work Order Update	<u> </u>		Large Fab	Composite		Supplier		
Root	1	Ī	Ĭ ł	Descri	iption of work order update	Initi	ial	Act	tion	Sign &			
Cause	Date	Step	Qty		or Non-conformance	Chief	Eng	Desci	ription	Date	Verification	QC Inspector	
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Operator		Ì										ļ	
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Other													
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Supplier													
Training			,										
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Landig	g Gear				General				_	_	_	_	
[Bending				Bend	Gr	ain			Ovalized	L	Pressure/Forced	
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ĺ	Cracks				Broken/Damaged	Ins	pecti	on Incomplete		Part Incorred	it	Weld	
	Crushed/	'Crimped			Burrs	lns	struct	ions Incomplete/l	Unclear	Part Lost/Mi	ssing	Wrong Stock Pulled	
[Cuffs				Contamination	M	ainte	nance		Part Moved	_		
[Heat Treat Countersink						islabe	led		Positioned V	vrong	_	
	Inspection Strip in Tube Cut Too Short					Mi	isread	1		Power Loss/	Surge	Other	
	Ripples in Bend Drill Holes						fset		_				
Torque Waves in Extrusion Drawing						Out of Calibration							
Turning Sequence Finish						Out of Sequence							
	Wave/Twist in Tube Folio						Outside Dimensions						

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Work Ordo May-28-13 8:42	2:49 AM	2351	· · · · · · · · · · · · · · · · · · ·	*102351*									
Item ID: Revision ID: Item Name:	646.3510 Strut	. " . <u>.</u>	. 	Accept	*N900	040	100)*	Setup	Start Stop	134	S1* S2*	
Start Date: Required Date: Reference:	5/27/13 : 6/08/13	Start Qty: 10.00 Req'd Qty: 10.00	*10* *10*		Cust Item ID: Customer:					Čt4		· ·	
Approvals:	Process Pla	n:	Date:	Tooling: SPC (Y/N):		te: te:			Run	Start Stop	*N *N	R1* R2*	
Sequence 1D/ Work Center 1 190 *1QA* Outsource4 Outsource process 200 *20A* Packaging Packaging		Operation Description Outsource process-Anodiz Memo Issua P/O: Anodixe as po	er dwg C	Set Up/ Run Hours 0.00 0.00 0.00	Tool ID	Tool #	Plan Code	Accept	Rej Qty		Reject Number	Insp. Stamp	
210 *210* QC Quality Control		QC5- Inspect part comple	teness to step on W/O	0.00	K)y -1	D	·					
			ST	-£	10	0x -	Ð						

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NCR:	Yes	/ No				WORK ORDER NON-	COI	NFOR	MANCE / UPDA	TE			
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Work Ord	or.					DISPOSITION				AGAINST DE	PARTMENT,	/PROCESS	
WOIN OIG						Rework	1		Skid-tube (Crosstube		Water Jet	Engineering
Part f	No.					Scrap	1	1	—	Small Fab	Pro	d. Eng. Coor.	Quality
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Į.		Heat Tres	at		1	Countersink	1	Mislaha	alad		Positioned M	Irong	

Misread

Out of Calibration

Out of Sequence

Outside Dimensions

Offset

Power Loss/Surge

Other

Turning Sequence

Wave/Twist in Tube

Inspection Strip in Tube

Ripples in Bend Torque Waves in Extrusion Cut Too Short

Drill Holes

Drawing

Finish

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Work Ordo <i>May-28-13 8:42</i>)2351		*102		Page 5				
Item ID: Revision ID: Item Name:	Revision ID: Item Name: Strut			Accept	*N900	04010	Setup Start Stop	i Vi	S1* S2*	
Start Date: Required Date: Reference:	5/27/13 6/08/13	Start Qty: 10.00 Req'd Qty: 10.00	*1(*1(Cust Item I Customer:	D:				
Approvals:	Process Pl	an:	Date:	Tooling: SPC (Y/N):		ate:	- -	Run Start Stop	1/1	R1* R2*
Sequence ID/ Work Center II 220	D	Operation Description		Set Up/ Run Hours 0.00	Tool ID	Tool# Plan Cod	e Qty	Qty	Reject Number	Insp. Stamp
220 SprayPaint Spray Painting			r dwg (see note 3)	0.00			1.0_	Ø_	Ø .	13-8-14
*230 *230*		QC14- Inspect Spray Pa	int	0.00			10			(DAS 05 13.08.15
QC Quality Control		Memo		0.00			_ _			2.89 ·
240 * 240 * 240 * 240 * 240 * Packaging				0.00			_10			13.08.15
Packaging		Memo ***1DENTI REV***	IFY AS PER APICAL	MPP-120 BY STAMPING TI	HE P# AND					

ST_527

10x

M.hl.13-08-15

									DQA:	Date:	
NCR: Yes	/ No				WORK ORDER NON-C	ONFOR	DATE	QA Closed:	Date:	<u>-</u>	
Work Order:					DISPOSITION			AGAINST DE	PARTMENT	/PROCESS	
					Rework Skid-tube Crosstube Scrap Machining Small Fab Thermoforming Finishing Work Order Update Large Fab Composite					Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other
Root				Descrip	tion of work order update	Initial	Ac	tion	Sign &		
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Landing Gear General Bending Bend Grain Ovalized Pressure/Forced BOM/Route Centre Not Concentric to O/S Over/Under tolerance Temperature/Cure Hardware lweld. Broken/Damaged Cracks Inspection Incomplete Part Incorrect Crushed/Crimped Burrs Instructions Incomplete/Unclear Part Lost/Missing Wrong Stock Pulled Cuffs Part Moved Contamination Maintenance Heat Treat Countersink Mislabeled Positioned Wrong Misread Other Inspection Strip in Tube Cut Too Short Power Loss/Surge Ripples in Bend Drill Holes Offset Out of Calibration Torque Waves in Extrusion Drawing Turning Sequence Finish Out of Sequence

Outside Dimensions 🚡

FAULT CATEGORY

Wave/Twist in Tube

Folio

Unapproved

Work Ord May-28-13 8:		02351	*102351*							Page 6		
Item ID: Revision ID: Item Name:	Revision ID: Item Name: Strut			Accept	*N9000	04010	Setup Start Stop		*NS1* *NS2*			
Start Date: Required Dat Reference:	5/27/13 ee: 6/08/13	Start Qty: 10.00 Req'd Qty: 10.00	*10* *10*		Cust Item ID Customer:	:			_			
Approvais:	Process P QC:	lan:	Date:	Tooling: SPC (Y/N):	Date:		·		Start Stop	*NR1* *NR2*		
Sequence ID/ Work Center 250 *250* QC Quality Control		Operation Description QC21- Final Inspection - Memo	Work Order Release	Set Up/ Run Hours 0.00	Tool ID	Tool # Plan Code	Accept Qty	Reje Qty		Reject Insp. Number Stamp		

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NCR:	Yes	/ No				WORK ORDER NON-O	COI	NFORM	MANCE / UPDA	TE			_	 ;
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Work Ord	or.					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS		
WOIK OIG	E1.	<u> </u>				Rework	1	ļ	Skid-tube (Crosstube		Water Jet	\neg	Engineering
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· .		Cuffs				Contamination		Mainte	nance		Part Moved		_	
1		Heat Trea	at			Countersink	Г] _{Mislabe}	led		Positioned V	Vrong		

Misread

Out of Calibration

Out of Sequence

Outside Dimensions

Offset

Power Loss/Surge

Other

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Inspection Strip in Tube

Torque Waves in Extrusion

Cut Too Short

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

May-28-13 8:42:49 AM

Work Order ID:

102351

Parent Item:

646.3510

Parent Item Name:

Strut

Start Date: 5/27/13

Required Date: 6/08/13

Start Qty: 10.00

Required Qty: 10.00

Comments:	JPP REV:A 12.10	.19 NEW ISSUE	DD VE	RF:JLM									
Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
M304S16GA 304/316 Sheet .063		Purchased	No				sf	446.0842	126	0.292632 5/59 <u> </u>	2 > _	,0.3	
				Location		Loc Qty	<u>Lo</u>	c Code			A	k 13	.07.13
				MAT020		446.0841688							
				1222	245	0.1713688							
				123		140.8							
				124		23.61							
				124:		25.5028							
				125	599	256	_						
M304TR0.500W.049 304 RD Tube .500 x .049V	v	Purchased	No				f	238.9197		8.76842 とて	132-	29	
				Location		Loc Oty	<u>Lo</u>	c Code					•
				GA		43.66							
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				MAT017		195.259716							
				119	087	0.000016							
				123	14 9	96.2597							
				125	513	99	56 ª		_ 7.	25			

NCR: Y	NCR: Yes / No WORK ORDER NON-CONFORMANCE / UPDATE													
		•							•		QA Closed:	Da	te:	
Work Orde	er:				-	DISPOSITION				AGAINST DI	EPARTMENT	/PROCESS		
Part No				Rework Scrap Use-as-is Work Order Update	Skid-tube Crosstube Machining Small Fab Thermoforming Finishing Large Fab Composite		Finishing	Prod. Eng. Coor. Rec/Store/Packaging			Engineering Quality Other			
Root Descri			Doccei	ption of work order update	_	Initial	Act	ion	Sign &		_			
Cause		Date	Step	Qty		or Non-conformance		nief Eng		ription	Date	Verification	,	QC inspector
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		Centre No	ot Concei	ntric to	o/s	BOM/Route		Hardwa	ire		Over/Under	tolerance	☐ T•	emperature/Cure
	П	Cracks				Broken/Damaged		Inspecti	ion Incomplete		Part Incorred	it	IJ٧	/eld
		Crushed/	Crimped			Burrs	Г	Instruct	ions Incomplete/L	Jnclear 📗	Part Lost/Mi	ssing	□]v	rong Stock Pulled
		Cuffs				Contamination		Mainte	enance		Part Moved	•		
Heat Treat Countersink				M islabe	eled		Positioned V	/rong						
	Inspection Strip in Tube Cut Too Short				Misread	i .		Power Loss/	Surge	o	ther			
		Ripples in	Bend			Drill Holes		Offset						
		Torque W	aves in E	xtrusio	n 🗀	Drawing		Out of 0	Calibration					

Out of Sequence

Outside Dimensions

Date:

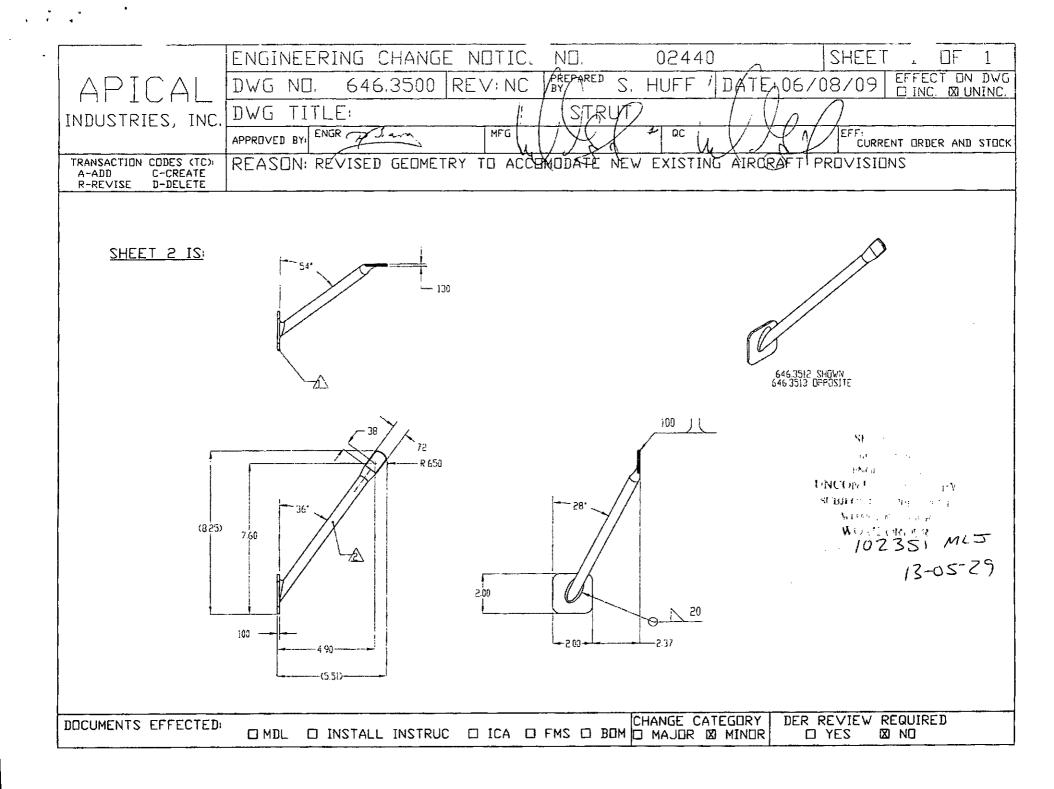
DQA:

Turning Sequence

Wave/Twist in Tube

Finish

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	ENGINEERING CHANGE NOTICE	NO. 02197	SHEET 1 OF 1
APICAL	DWG NO. 646.3500 REV:N/C	PREPARED S. HUFF DATE	E: 01/05/09 EFFECT ON DWG
INDUSTRIES, INC.	DWG TITLE:	STRUT	\
	APPROVED BY ENGR Fram MFG	Ilke oc	PEFF: NEXT DRDER
TRANSACTION CODES (TC): A-ADD C-CREATE R-REVISE D-DELETE	REASON: REVISED ANGLE OF 646.3512	! & 646.3513 FOR BEVITER_F	ITMENT
SHEET 2, IS	72 38 72 75 75 75 75 75 75 75 75 75 75 75 75 75 7	646 3512 SHGWN 646 3513 OPPOSITE	DER REVIEW REQUIRED
DUCUMENTS EFFECTED	□ MDL □ INSTALL INSTRUC □ ICA □	CHANGE CATEGORY ROMAN MANUEL CATEGORY	D YES X NO

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MATERIAL: 4041 JA ALUMINUM TAW AND CO A 25011- 304 Sheet, 063 THK

MATERIAL: 4061-76 ALUMINUM TAW AMS WW-1-70076 304 SEAMLESS TUBE, \$0.500 O.D × 0.045 WALL

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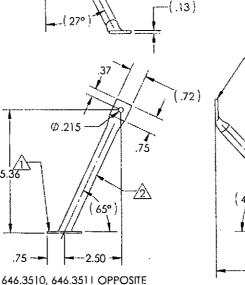
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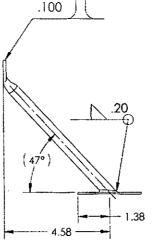
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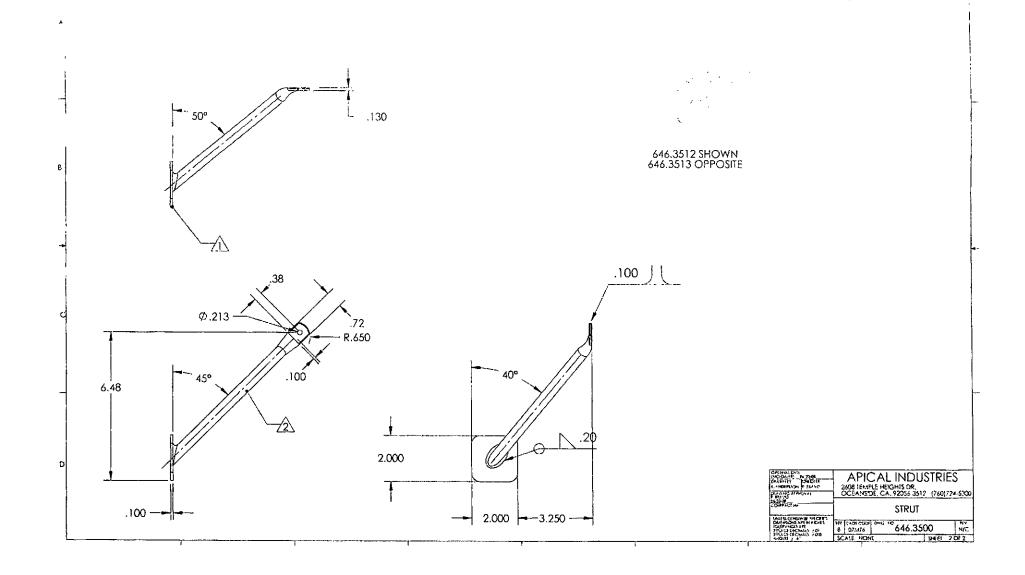


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Kim Johnston

From:

Jean-Luc Menard

Sent:

Thursday, April 25, 2013 7:51 AM Andrea Beutler; Kim Johnston

To: Cc:

David Duval; Linda Lacelle; Pablo Bravo

Subject:

FW: 646.3510/3511/3512/3513 STRUT ASSY

Hi Andrea,

I have uploaded ECR D-13-33 into dropbox.

Kim.

Pls place the affected dwgs/item cards under review Listed above.

JL XHT

From: Pablo Bravo

Sent: April-24-13 2:23 PM **To:** Jean-Luc Menard

Cc: David Duval; Linda Lacelle

Subject: RE: 646.3510/3511/3512/3513 STRUT ASSY

JL,

This should be okay.

Pablo

From: Jean-Luc Menard

Sent: Wednesday, April 24, 2013 9:15 AM

To: Pablo Bravo

Cc: David Duval; Linda Lacelle

Subject: Fwd: 646.3510/3511/3512/3513 STRUT ASSY

Any news on this?

Sent from my iPhone

Begin forwarded message:

From: Jean-Luc Menard < jmenard@dartaero.com>

Date: 22 April, 2013 10:27:05 AM EDT **To:** Pablo Bravo pbravo@dartaero.com

Cc: David Duval <dduval@dartaero.com>, Linda Lacelle <llacelle@dartaero.com>

Subject: 646.3510/3511/3512/3513 STRUT ASSY

Hi Pablo,

We have started manufacturing the struts and have run into some problems with cracking when punching/bending the end of the struts.

Would going to 304 ss tubing with .049" wall be an acceptable deviation?

This would include changing the bottom plate that gets welded on also to SS.

Let me know asap so I can attach to the w/o and if acceptable I will issue a ECR.

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DART AEROSPACE LTD	Work Order:	102351
Description: STRUT	Part Number:	64 63500
Inspection Dwg: 646.35(WRev: N/C		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
2.75	+1030	2.76	_		V	JKM-01
1.50	+1030	1.5D			V	
.063	+1010	.056			v	
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			240			

Measured by:	Ac	Audited by:	-	Preliminary Approval:	
Date:	13.07.13	Date:	13715	Date:	

Rev	Date	Change	Revised by	Approved
E	10.04.14	Added preliminary approval	KJ	

A 10.04.15

